irritating. Other editorial aspects also leave much to be desired. The referencing and indexing is not very helpful, even the date to one of the author's papers is wrong. All this may sound rather churlish. Who cares whether some of the data quoted have stood the test of time or not, when one is reading the thoughts of one of the major contributors to the study of the properties of proteins.

The contents starts with thermodynamic fundamentals, and continues with basic treatments of ligand binding to monomeric and oligomeric proteins. Chapters on inter- and intra-molecular forces and solvent interaction complete the basic part. This is followed by some special topics, such as detection and measurement of the statics and dynamics of associations, effects of temperature and pressure, dissociation of protein dimers and biological specificity of ligand binding. Cooperativity is not a major concern of Weber's treatment and he avoids the prevalent confusion of this subject with allostery by ignoring the latter.

Many people will enjoy reading this book and some will be annoyed by it, or parts of it. As for recommending it to graduate students, I would only give it to critical ones with high grades. It will sharpen their wits!

H. Gutfreund

Protein–DNA Interactions (Methods in ENZYMOLOGY, Vol. 208); Edited by Robert T. Sauer; Academic Press; San Diego, CA, 1991; xxxi + 700 pages, $90.00, £54.50.

This recent addition to the above series covers in a comprehensive manner the subject of DNA binding proteins, which play a key role in a variety of fundamental cellular processes, such as replication, recombination, transcription, transposition, restriction, and DNA repair. Published in late 1991, it is exemplary in its up-to-date coverage of the literature in that it is not only replete with references to publications in 1990, but includes a number which appeared in 1991.

The volume is divided into four major sections, as follows: I, Purification and Characterization; II, DNA Binding and Bending; III, Biochemical Analysis of Protein–Nucleic DNA Interactions; IV, Genetic Analysis of Structure–Function Relationships. These include 31 sub-sections which describe most conceivable approaches to defining the nature and specificity of protein–DNA interactions.

Bearing in mind that the differences between specific and non-specific protein–DNA complexes may frequently be quite small and difficult to characterize, particular interest attaches to sub-section 7 on the crystallization of protein–DNA complexes for X-ray diffraction studies. For this purpose the DNA fragments used for co-crystallization with a given protein are initially selected on the basis of analyses of genetic and biochemical data (covered in sections III and IV). The synthesis and purification of these fragments, and the techniques employed for co-crystallization, are exhaustively reviewed. Protein–DNA complexes already obtained in crystalline form, and the conditions for obtaining them, are listed in a Table. A separate sub-section (No. 5) describes the large-scale preparation of DNA fragments for physical studies of protein binding.

The use of multidimensional NMR spectroscopy for determination of the stucture of DNA binding proteins in solution is reviewed in sub-section 6. This approach, already applied to two protein–DNA complexes, the *lac* repressor–operator system and the *Antennapedia*–DNA complex, will undoubtedly provide the impetus for further efforts in this direction. It is rather odd that the pioneer in this field, K. Wuthrich, is also frequently cited as K. Wuethrich (both listed in the Author index), which may confuse some readers.

The use of purine and pyrimidine base analogues for investigating their effects on the structure of model oligonucleotides, and the resultant effects on interactions with proteins, is now fairly widespread. Sub-section 21 examines the effects of a broad range of such base analogues on the specificities of numerous restriction enzymes. While comprehensive in scope, interpretations of results are limited to kinetic analysis of the hydrolysis reactions. The authors might usefully have included some information on the tautomerism, ionic forms, and rotamer conformations of exocyclic groups, of several of these analogues: these factors must play some significant role in recognition by a protein, including a restriction enzyme. Attention might also have been directed to the fluorescence properties of several analogues, which could be useful as probes for following both specificity and kinetics of binding. Complementary to this section is sub-section 23, dealing with specific chemical modifications of proteins as probes for structure–function relationships; and several contributions to Section IV, dealing with genetic methods.

This is a useful volume to have beside one at the lab bench, both for research workers and graduate students. And the detailed Subject Index is a useful adjunct for rapid location of specific topics.

David Shugar

Electrophoresis of Large DNA Molecules: Theory and Applications (Current Communications in Cell & Molecular Biology, vol. 1); Edited by E. Lai and B.W. Birren; Cold Spring Harbor Laboratory Press; New York, 1990; x + 156 pages. $34.00.

The ability to manipulate DNA of megabase size has enormous potential in molecular genetics and there is obvious interest in exploiting to the full the electrophoretic techniques first described by the Carle/Olson and Schwartz/Cantor groups in 1984. The

problem is that separation of DNA molecules greater than 50 kilobase pairs by pulsed field gel electrophoresis (PFGE) was developed rather empirically. Hence attempts have been made to explain how periodically altering field vectors leads to cycles of folding/unfolding of long DNA molecules caught around fibres in the gel and their consequent separation on a molecular weight basis. This book is largely about such attempts and the contents are based on the proceedings of a Cold Spring Harbor Laboratory Conference in 1990 at which some consensus emerged on the mechanisms underlying PFGE. The multi-author form of several of the chapters is due to workers from different laboratories providing joint accounts. The eight main chapters provide a reasonable approach but their order defies logic. Deutsch's description of the theoretical aspects of electrophoresis and Kilpatrick's treatise on the properties of agarose gels should have come first, followed by Lerman and Sunha on resolution in gel electrophoresis and then the chapters on the application of PFGE. The contributions headed by Akerman, Holzwarth and Smith are important in that they provide experimental evidence to test models of DNA migration in gels. Unfortunately they appear to have been written for other physical chemists and only the chapter by Smith et al. provides a clear but lengthy summary. The reader has to consult the concluding 'Perspective' section by the editors for confirmation that models based on reptation, hooks and kinks each help to explain some of the processes acting on DNA in PFGE. PFGE covers a range of similar techniques, and a high resolution PC-controlled form is described by Turmel's group. Lastly, a combined Dutch, German and British chapter deals with the application of PFGE to the mapping of gene defects in human hereditary diseases. The thrust of the book will be of little use to the beginner who might be advised to consult the editors' other 1990 review (Methods: A Companion to Methods in Enzymology: Pulsed Field Gel Electrophoresis, vol. 1, number 2, Academic Press). This is still a developing technique (Cantor has recently shown the effects of DNA concentration on PFGE; (1992) Nucleic Acids Res. 20, 859–863) and this book can only act as a window-in-time.

A.J. MacGillivray

DNA Cloning/Sequencing Workshop: A Short Course; by K. Firman; Ellis Horwood; New York, 1990; 102 pages. $59.95.

This manual is intended to provide the foundation for individuals who wish to run a short course or series of practical classes in genetic engineering. It is directed mainly at senior graduate course level, however, some of the techniques described in this text are now being used at second year undergraduate level

The first chapter opens with an introduction containing brief descriptions of all of the procedures involved in cloning and sequencing, including plasmid purification, Sanger dideoxy sequencing, M13 cloning and ligation. Also included is a description of ways in which DNA can be labelled, including non-isotopic labelling techniques. Chapter two is merely a summary of cloning procedures performed on a daily basis over a five day period, forming the basis of a cloning and sequencing course. Chapters three and four provide easy to follow, in depth, step by step protocols for all of the procedures required for running such a course. What is particularly commendable in these two chapters is the inclusion of a list of notes alongside the protocols, which provide additional information normally only acquired through trial and error. Also included in this volume is an appendix which lists the main material requirements in the order in which they occur in a daily schedule of protocols over a five day period. Unfortunately, what is sadly lacking is a comprehensive listing of names and addresses of reagent suppliers.

It is inevitable in a volume providing protocols for well-established techniques, that there will be significant overlap with methods in previously published texts. However, as this volume is not directed toward research molecular biologists, the inclusion of full protocols is justified. Disappointingly, there are no references to protocols in related texts and suprisingly, no reference to the widely used volumes 'Guide to Molecular Cloning Techniques' and 'Current Protocols in Molecular Biology'.

Despite these small quibbles, this volume appears a useful acquisition for laboratories wishing to set up short molecular biology courses or small pratical classes.

Stephen Heath

Sequencing of Protein and Peptides, (Laboratory Techniques in Biochemistry and Molecular Biology, Vol. 9; Edited by R.H. Burdon and P.H. van Knippenberg. Second revised edition); By G. Allen, North-Holland; Amsterdam, New York, Oxford, 1989; xix + 425 pages; Dfl. 89.00. ISBN 0-444-81021-8.

During the past two years some 300 protein sequence determinations have been published. Knowledge of the primary structure is vital for the understanding of protein structure and function. There has been a tremendous drive in recent years to study, in particular, proteins associated with specific clinical conditions and intractable membrane proteins which require special methods for their isolation and study. These are often available only in small quantities and it is vital to have reliable methods for their isolation, purification and subsequent primary sequence analysis. The pressure is always on to work with ever-smaller quantities and also to carry out the work in ever-shorter time. Many protein sequences may be deduced from nucleotide